JCP STRUCTURAL AND CIVIL ENGINEERS

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Unit 7, Boscombe Centre, Mills Way,
Amesbury, Wiltshire, SP4 7SD

Our Ref: 16568/EO/LTR/03
Date: 31 October 2023

c/o Tim Scrace
Scrace Architects,
TEN,
The Old Fire Station,
2 Salt Lane
Salisbury
SP1 1DU

To Whom It May Concern,

Re: 60A Winchester Street, Salisbury, SP1 1HL – New Infill Roof Section



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Summary:

Our conclusion from our desktop assessment is that the infill roof section appears to have been adequately installed; the roof construction is sufficiently strong for the loads imposed on it and we have no reason to believe that the roof as constructed should not continue to remain structurally stable.

Introduction:

We were instructed by you to visit the premises and undertake a structural inspection of the property in relation to some proposed internal structural refurbishment works. As part of that process, we are asked to assess the adequacy of an infill roof section.

We only measured the building in the areas which were exposed. Parts of the structure, which were covered, unexposed or inaccessible, were not inspected. We are therefore unable to report that any such part of the property is free from defect. No measurements were taken for damp penetration or timber decay.

This letter is prepared for the sole benefit of the client by whom it is commissioned and we have no liability or duty to any other parties in respect of the contents or opinions expressed.

An inspection, without exploratory cutting away or the provision or use of special access equipment, was carried out on Thursday 21 September 2023. At the time of inspection, the property was occupied and fully furnished. A desktop study was subsequently carried out to assess the adequacy of the roof, based on historic information provided by others.

General Description:

The new infill roof is a flat roof understood to consist of 4” x 2” treated timber joists, 18mm OSB roof board with appropriate roof finishes; the roof consists of 2No. x flat roof glass openings. The flat roof joists are understood to span approximately two meters between the existing rails on the supporting walls.

Observations and Discussion:

1. The photographic records appear to indicate the roof timbers were appropriately installed and in good condition (refer to Appendix A for photographic records).
2. The trimming of the glass roof lights appears to have been appropriately carried out (refer to Appendix A for photographic records).
3. The support condition detail appears to be adequate; the roof joists appear to be receiving a positive bearing onto the existing timber rails on both sides (refer to Appendix A for photographic records).

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4. Our calculations indicate that the joists as installed are sufficiently strong (per our calculations in Appendix B of this letter).

Conclusion:

In our opinion, the infill roof section appears to have been adequately installed; the roof construction is of sufficiently strong for the loads imposed on it and we have no reason to believe that the roof as constructed should not continue to remain structurally stable.

Trusting that this provides you with sufficient information for your needs but if you have any queries or require further clarification, please do not hesitate to contact us.

Yours sincerely,

For JCP Engineers

Eric Ojjerro **BEng (Hons) CEng MIStructE**
Director

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Appendix A: Site Photographs



Photograph 01: 60A Winchester Street, Salisbury, SP1 1HL
Photographic record of installed infill roof sections (by others)

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Photograph 02: 60A Winchester Street, Salisbury, SP1 1HL
Photographic record of installed infill roof sections (by others)

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Photograph 03: 60A Winchester Street, Salisbury, SP1 1HL
Photographic record of installed infill roof sections (by others)

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Appendix B: Roof Load Calculation

Flat roof load (new):

Flat roof joists	=	0.20	kN/m²
Roof covering, battens, felt, insulation, etc	=	0.10	kN/m²
18mm OSB board	=	0.10	kN/m²
Plasterboard ceiling & skim coat	=	0.10	kN/m²
Total flat roof dead load	=	0.50	kN/m²
Flat roof imposed load (small roofs to BS 6399)	=	0.75	kN/m²
Total flat roof load	=	1.25	kN/m²

Timber joist design (Bs5268-2:2002)

Tedds calculation version 1.1.04

Joist details

Joist breadth; b = **47** mm

Joist depth; h = **100** mm

Joist spacing; s = **400** mm

Timber strength class; **C24**

Service class of timber; **1**

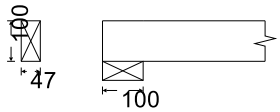


Span details

Number of spans; N_{span} = **1**

Length of bearing; L_b = **100** mm

Effective length of span; L_{s1} = **2300** mm



Section properties

Second moment of area; I = b × h^3 / 12 = **3916667** mm^4

Section modulus; Z = b × h^2 / 6 = **78333** mm^3

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Loading details

Joist self weight; $F_{swt} = b \times h \times r_{char} \times g_{acc} =$ **0.02** kN/m

Dead load; $F_{d_udl} =$ **0.50** kN/m^2

Imposed UDL(Medium term);

$F_{i_udl} =$ **0.75** kN/m^2

Modification factors

Service class for bending parallel to grain;

$K_{2m} =$ **1.00**

Service class for compression;

$K_{2c} =$ **1.00**

Service class for shear parallel to grain;

$K_{2s} =$ **1.00**

Service class for modulus of elasticity;

$K_{2e} =$ **1.00**

Section depth factor; $K_7 =$ **1.13**

Load sharing factor; $K_8 =$ **1.10**

Consider medium term loads

Load duration factor; $K_3 =$ **1.25**

Maximum bending moment; M = **0.341** kNm

Maximum shear force; V = **0.594** kN

Maximum support reaction; R = **0.594** kN

Maximum deflection; d = **4.575** mm

Check bending stress

Bending stress; $s_m =$ **7.500** N/mm^2

Permissible bending stress; $s_{m_adm} = s_m \times K_{2m} \times K_3 \times K_7 \times K_8 =$ **11.637** N/mm^2

Applied bending stress; $s_{m_max} = M / Z =$ **4.357** N/mm^2

PASS - Applied bending stress within permissible limits

Check shear stress

Shear stress; t = **0.710** N/mm^2

Permissible shear stress; $t_{adm} = t \times K_{2s} \times K_3 \times K_8 =$ **0.976** N/mm^2

Applied shear stress; $t_{max} = 3 \times V / (2 \times b \times h) =$ **0.189** N/mm^2

PASS - Applied shear stress within permissible limits

Check bearing stress

Compression perpendicular to grain (no wane);

$s_{cp1} =$ **2.400** N/mm^2

Permissible bearing stress; $s_{c_adm} = s_{cp1} \times K_{2c} \times K_3 \times K_8 =$ **3.300** N/mm^2

Applied bearing stress; $s_{c_max} = R / (b \times L_b) =$ **0.126** N/mm^2

PASS - Applied bearing stress within permissible limits

Check deflection

Permissible deflection; $d_{adm} = \min(L_{s1} \acute{} 0.003, 14\text{ mm}) =$ **6.900** mm

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Bending deflection (based on E_{mean});

$d_{bending}$ = **4.446** mm

Shear deflection; d_{shear} = **0.129** mm

Total deflection; $d = d_{bending} + d_{shear}$ = **4.575** mm

PASS - Actual deflection within permissible limits